

# Proposed Amendments to the Commercial Harbor Craft Regulation for Crew and Supply Vessels Workshop



**Santa Barbara**

March 2, 2009



California Environmental Protection Agency

Air Resources Board

## Overview

- ◆ Background
- ◆ Proposed Regulation Amendments
- ◆ Regulation Timeline
- ◆ State Repower Capacity
- ◆ Emission Reductions and Cost
- ◆ Questions ???



## Commercial Harbor Craft Regulation

- ◆ Board approved in November 2007
- ◆ Became effective November 2008
- ◆ Operational and new engine requirements for all commercial harbor craft
- ◆ In-use engine requirements for ferries, excursions vessels, tugboats, and towboats

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## Health Risk Assessment

- ◆ Port POLA / POLB Health Risk Assessment
  - Commercial Harbor Craft third largest contributor to risk behind ocean going vessel hotelling and cargo handling equipment
- ◆ POLA / POLB CHC Emissions Cancer Risk
  - >200 cases per million risk (5,000 residents)
  - >10 cases per million risk (1.5 million residents)
  - Significant source of PM mortality

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## Why Were Crew and Supply Vessels Excluded from Original In-Use Engine Requirements?

- ◆ Crew and supply emissions are a small portion of the overall statewide harbor craft emissions
- ◆ Low response rate to the original CA harbor craft survey resulted in inaccurate data
  - Crew and supply emissions skewed low



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## Updated Crew and Supply Vessel Survey Conducted

- ◆ Higher response rate
- ◆ More complete data
- ◆ Updated inventory with new crew and supply vessel population and activity level

A close-up photograph of a table with a blue tint. The table contains several rows of numerical data, with the rightmost column showing positive values. The values are: +2.088, +5.000, +1.500, +1.125, and +1.062. The table is partially obscured by the text on the left.

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## Why Add In-Use Engine Requirements for Crew and Supply Vessels?

- ◆ Significant source of harbor craft emissions in Santa Barbara and Ventura
- ◆ Size and operational characteristics similar to ferries, excursion vessels, tugboats, and towboats
- ◆ Vessels work close to shore



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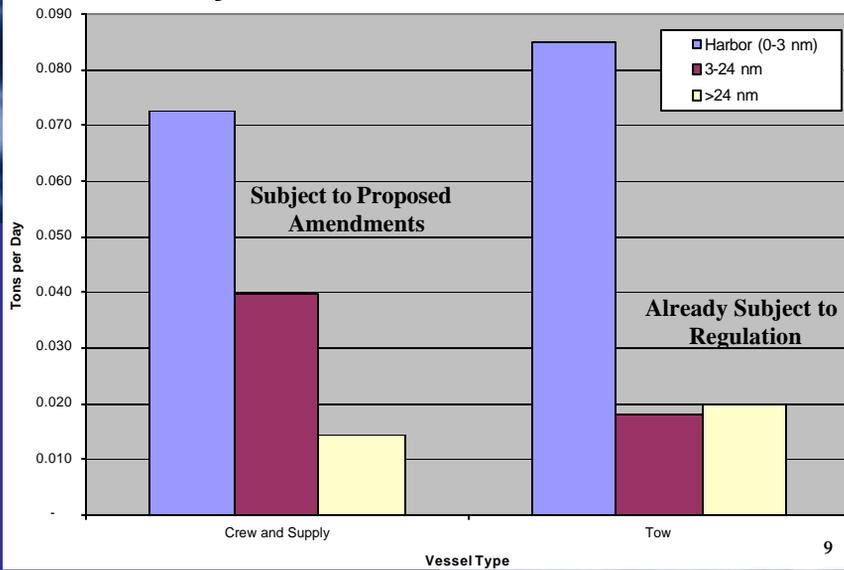
## New Survey Revealed Higher Engine Hours and Emissions

	2004 Inventory*	2008 Updated Inventory**
# Vessels	64	63
# Propulsion Engines	160	152
Average Horsepower	439	505
Average Annual Hours	<b>788</b>	<b>2438</b>
# Auxiliary Engines	70	70
Average Horsepower	83	96
Average Annual Hours	3036	3524
PM Emissions (tpd)	<b>0.1</b>	<b>0.2</b>
NOx Emissions (tpd)	<b>1.4</b>	<b>3.9</b>

\*based on 2004 survey data – 34% response rate for crew and supply vessels  
 \*\* based on 2008 survey data – 78% response rate for crew and supply vessels

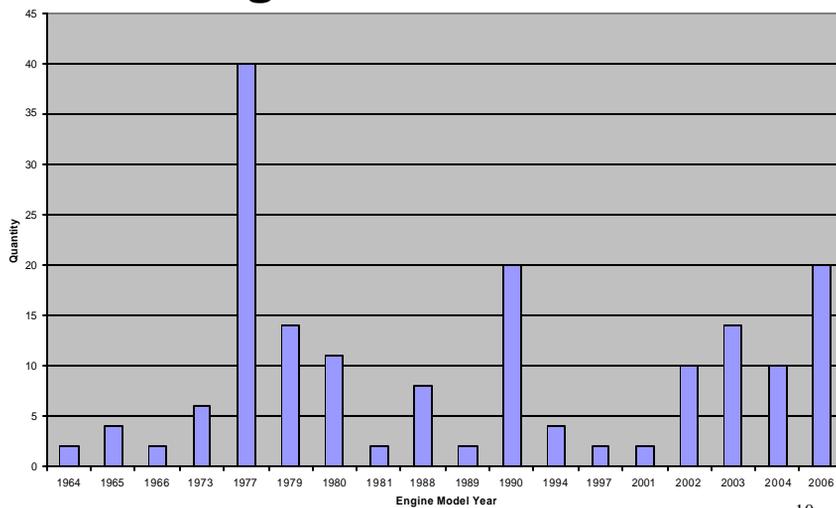
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## Crew and Supply Vessels Operate Primarily Near Shore and Within 24 nm



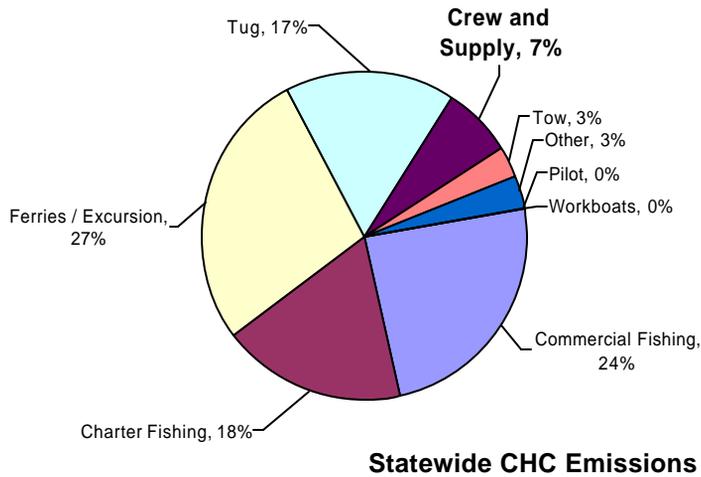
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## Crew and Supply Main Engine Age Distribution



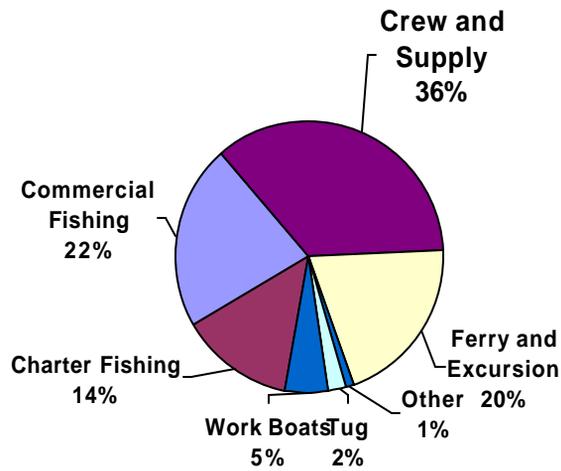
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## Statewide, Crew and Supply Vessel Emissions



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## Crew and Supply Largest Single Contributor to Santa Barbara and Ventura Harbor Craft Emissions



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## Crew and Supply In-Use Engine Requirements

- ◆ Similar to those for ferries, excursion vessels, tugboats, and towboats
- ◆ Phased compliance schedule brings oldest, highest use engines into compliance first
- ◆ Requires unregulated and Tier 1 engines to meet U.S. EPA Tier 2 or Tier 3 standards
- ◆ Compliance methods, engine model year determination, extensions, and alternative compliance plan all consistent with original regulation

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## Draft Regulatory Language Available

- ◆ Available on the harbor craft webpage
- ◆ Key definitions:
  - “Crew and Supply Vessel” means a self-propelled vessel used for carrying personnel and/or supplies to and from off-shore and in-harbor locations. (including, but not limited to, off-shore work platforms, construction sites, and other vessels).
  - “Off-shore location” means a location isolated from the mainland by a body of water.

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## Compliance Schedule

- ◆ Single statewide schedule for crew and supply
- ◆ First compliance date in 2011 and last in 2022

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## Proposed Compliance Schedule for Crew and Supply Vessel Engines

1985 and earlier (>1500 hours)	2011
1985 and earlier (>300 - <1500 hours)	2012
1986-1995 (>1500 hours)	2013
1986-1995 (>300 - <1500 hours)	2014
1996-2000 (>1500 hours)	2015
1996-2000 (>300 - <1500 hours)	2016
2001-2002 (>300 hrs)	2017
2003 (>300 hrs)	2018
2004 (>300 hrs)	2019
2005 (>300 hrs)	2020
2006 (>300 hrs)	2021
2007 (>300 hrs)	2022

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## Same Compliance Methods as for Ferries, Excursion Vessels, Tugboats, and Towboats

- ◆ Replace with engine meeting current standard
- ◆ Demonstrate in-use engine meets standard
  - Tier 2 prior to Tier 3 effective date
  - Tier 3 when standard becomes effective
- ◆ Demonstrate in-use engine operates less than 300 hours annually



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## Engine Model Year for Compliance Date Determination

- ◆ Engine's actual model year
- ◆ Engine's actual model year +5
  - If a diesel emission control strategy is employed that reduces the PM or NOx emissions by >25%
- ◆ Engine Tier 1 Rebuild Model Year
  - If Tier 0 engine was rebuilt to meet Tier 1 standards prior to January 1, 2009

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## **Alternative Compliance Plan**

- ◆ Operators may comply using alternative emission control plan
- ◆ Must achieve equivalent or greater reductions
- ◆ Application process includes public review

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## **Compliance Date Extensions**

- ◆ Change in annual engine hours of operation
- ◆ No suitable engine replacement
- ◆ Manufacturer delay or installation difficulties
- ◆ Multiple engines on multiple vessels within fleet requiring compliance in one year

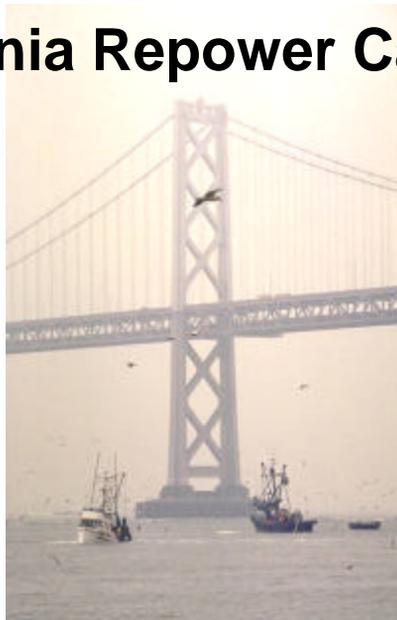
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## Exemptions from In-Use Engine Requirements

- ◆ Temporary replacement vessels
- ◆ Registered historic vessels
- ◆ Engines rated at less than 50 horsepower
- ◆ Engines operated less than 300 hours per year
- ◆ Near-retirement vessels

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## California Repower Capacity



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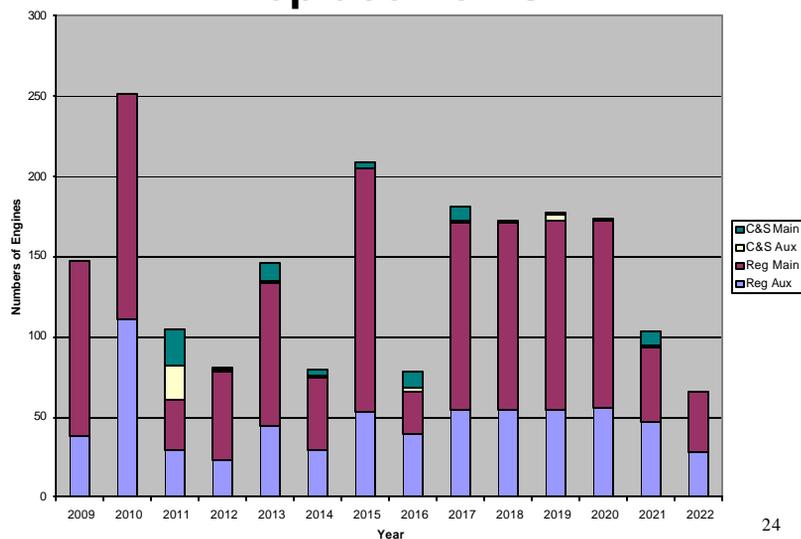
## Estimated Statewide Engine Repower Capacity

Region of the State	Numbers of Engines
Northern California	76 - 101
Los Angeles Area	93 - 110
San Diego Area	48 - 60
Total Capacity Statewide	217 - 271

- ◆ Contacted 50+ marine vessel boat yards, vessels builders, or vessel repair facilities statewide

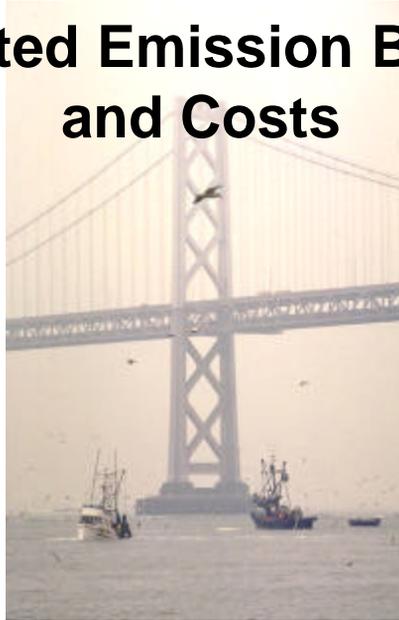
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## No Significant Impact from Additional Crew and Supply Vessel Engine Replacements



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## Estimated Emission Benefits and Costs



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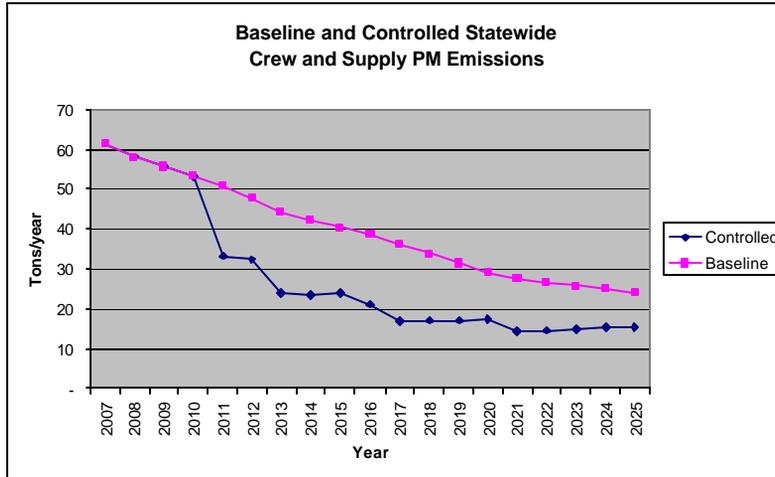
## Estimated Emissions Benefits

- ◆ Total emissions reductions from crew and supply vessel engines over life of the regulation
  - 223 tons PM
  - 3,500 tons NO<sub>x</sub>



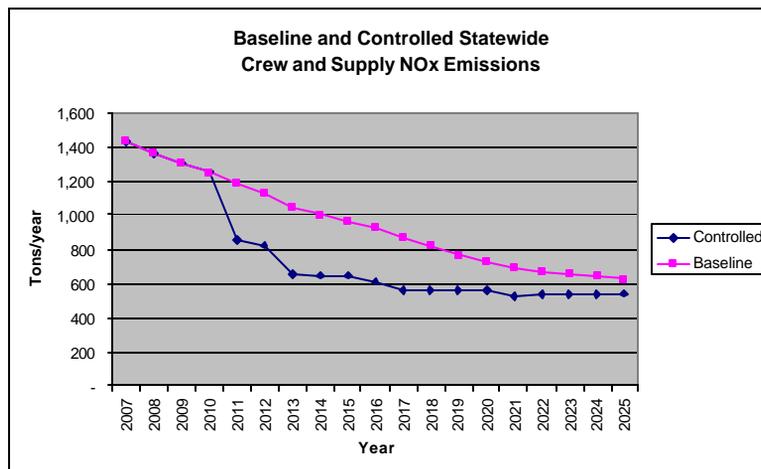
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# Baseline and Controlled Statewide Crew and Supply PM Emissions



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# Baseline and Controlled Statewide Crew and Supply NOx Emissions



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## Total Cost for Crew and Supply Vessel Engines

- ◆ \$19 million industry cost for new equipment
- ◆ \$7.5 million total cost of regulatory compliance
- ◆ \$13/lb PM (all costs attributed to PM)



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## Estimated Engine Replacement Costs

Engine Category	Average Cost (\$/hp)
Propulsion Engine	\$270
Auxiliary Engine	\$233



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## Crew and Supply Cost Effective Due to Large Percentage of Older Engines

Cost Effectiveness			
All Costs Attributed to PM (\$/lb)			
	Auxiliary Engine	Propulsion Engine	Overall
Ferry, Excursion, Tug, Tow	\$77	\$27	\$28
Crew and Supply	\$15	\$13	\$13
All Costs Attributed to Nox (\$/ton)			
	Auxiliary Engine	Propulsion Engine	Overall
Ferry, Excursion, Tug, Tow	\$11,818	\$3,370	\$3,560
Crew and Supply	\$2,073	\$1,622	\$1,649

**Notes:** Ferry, Excursion, Tug, Tow - 2006 dollars  
Crew and Supply - 2008 dollars

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## Funding Opportunities for Crew and Supply Vessels

- ◆ Require real, surplus, quantifiable, and enforceable reductions
- ◆ Carl Moyer Program
- ◆ Proposition 1B
  - Funding in specific trade corridors only:
    - Los Angeles/Inland Empire, Central Valley, Bay Area, and San Diego/Border
- ◆ Contact your local air pollution control district

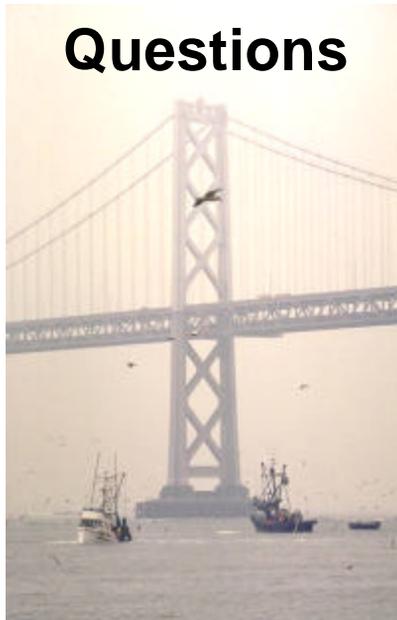
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## Questions



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